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that a college education is no longer highly prized. Above all, we find nothing in the character (generally speaking) of the alumni of these institutions, in the positions which they hold in society in after life, or in the manner in which they discharge the duties of those positions, which warrants the belief, that a college education is of any less intrinsic value at this time than it was, and is admitted to have been, before our Revolution; especially when it must be allowed by every candid and thorough examiner, that far less was taught then than now. We submit, therefore, that we have other and better reasons than a blind attachment to things as they are for remonstrating against any sudden and radical change in our present collegiate system, and for maintaining, till the contrary shall be proved by actual experiment, the great utility of an extensive and thorough general education.

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- ART. III. — 1. *Principles of Zoölogy, touching the Structure, Development, Distribution, and Natural Arrangement of the Races of Animals, Living and Extinct.* Part I. *Comparative Physiology.* By LOUIS AGASSIZ and AUGUSTUS A. GOULD. Boston: Gould, Kendall & Lincoln. 1848. 12mo. pp. 216.
2. *Proceedings of the American Association for the Advancement of Science.* Second Meeting, held at Cambridge, August, 1849. Boston: H. Flanders & Co. 1850. 8vo. pp. 459.
3. *The Foot-Prints of the Creator, or the Asterolepis of Stromness.* By HUGH MILLER, Author of "The Old Red Sandstone," etc. *With a Memoir of the Author.* By LOUIS AGASSIZ. Boston: Gould, Kendall & Lincoln. 1850. 12mo. pp. 337.

IF the condition of humanity is under the control of Providence, and if that Providence be beneficent, and have the power to carry its will into effect, then must that condition always be progressive. And mankind is at every moment in some determinate stage of its progress. In some ages this progress may be more obvious than in others. In some, it may be exhibited by an incontestable and salient advance,

while in others, there is a pause like that of a strong man, preparing to leap forward. And if the world seems to retrograde, it is but to gain a new position, and become ready to advance in a new direction. All these differences, and more, exist among the ages. But there is no one of them which is not full of interest and instruction, if its characteristics be investigated for the purpose of discovering in what way the forward march of mankind is then aided or obstructed, and what are the elements of human character and human action which then hasten or retard its progress. For herein lies a lesson which may make the wisest wiser; which none can learn perfectly, because none can fathom the counsels of the Infinite; but which, in proportion as it is learnt for guidance and direction, enables individuals and generations to coöperate with Omnipotence. And every age has its own lesson, and adds its own peculiar gift to the ever accumulating mass of that knowledge which springs from experience.

The books, of which we have placed the titles at the head of this article, illustrate characteristics of this age which seem to us of great importance. They place, in strong light, one aspect of science, which may best be considered with reference to some points of its history. We refer particularly to the wide diffusion of knowledge; a point which mankind have reached by a slow progress from a very different beginning.

The earliest traces of systematic knowledge are found in Egypt. There it was a consecrated mystery. Possessed only by the priesthood, and held by them as their exclusive and inalienable privilege, it was no more thought possible to give it to the people, than to invite them to come through the sphinx-guarded avenue to the penetralia of the temple, and minister at its inmost altar. There the school of Pythagoras acquired its singular knowledges, of which a part, at least, of modern discovery, is but the revival. Recent investigations in the new science of Palæontology have made it probable that, in the earliest records of man which we possess, we see not the beginning of human culture, but the last traces of the closing period of an extensive and peculiar culture,\* which,

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\*From some passages we have seen of the Chevalier Bunsen's recent work, "Egypt's Place in Universal History," we infer that he, who is the very highest authority upon all questions of Ethnology, maintains this supposition, and rests upon it important conclusions respecting the early history of Egypt; but we have never met with the book.

perhaps, reached a high pitch, but was of a kind so different from our own, that it might be difficult to comprehend it, even if we were in possession of full and distinct memorials ; and it is certainly impossible to form any complete idea of it from the scanty means now within our reach. The school, or the age, of Pythagoras performed the very important office of transmitting some of the elements of this culture, which had survived to their time, to a new race and a new scene, — to Europe. They were given in charge to the intellect of Greece ; committed to that fertile soil, they grew and fructified, and became the parents of all succeeding cultivation.

The especial change we have now to contemplate is that which began to dissolve the close connection between science and religion. With Pythagoras, and in all Italian Greece, this severance was incomplete. Knowledge came forth from the temples, but still wore her sacred robes, still claimed to be divine by birth and nature and office, and was still protected by a discipline and a mystery, which interposed between her and the profane touch of the common world a barrier only less impassable than the massive walls of her Egyptian home. Much of this faded away, and rapidly, when the chief seats of the new action of the human intellect were to be found on the coasts of Ionia and in Athens. Here, we might believe, freedom of thought was reached at last. The mind of Plato, towering like Olympus, rested firmly on the solid earth while it pierced the heavens. From its very elevation, it too often veiled its summit with impenetrable cloud. His eloquence and genius no one denies ; but he exhibits often the most admirable good sense, and a marvellous power of penetrating behind the veil of custom and tradition and established prejudice, and discovering the true principles of man's nature and the true promise of his destiny. With this, however, we find a mystery ; a pause, as if at the moment of a complete revelation, and then an enwrapping of his meaning in parable and myth. This, even if we knew it not otherwise, might suggest to us that, for some reason, he dared not say the whole. We do indeed know, that not only in the religious mysteries, but through almost the whole philosophy of Greece, there prevailed a distinction between the *exoteric* doctrine which all might know, and the *esoteric* which could

be given only to the initiated and the trusted. Precisely where the line was drawn, we do not know ; but that it was drawn, we know ; and therefore we know that a large proportion of the belief and instructions of their wisest men was purposely made a mystery. Compared with the condition of human knowledge in Egypt, it seems in Greece to have come forth into the open air, and presented itself to the people in the academy, the porch, on the stage, and in the schools. But, if we remember that neither the means nor the wish existed to give to the masses even the elements of this higher knowledge, and that little, if any, of what was deemed the highest was communicated to any but the chosen few, and to them under the seal of secrecy, we perceive but little progress towards the popularization of knowledge.

Science, whether of mind or of external nature, was not among the great elements of the Roman character. There was no want of intellectual power ; but force of character and the energy which displayed itself in will and in action, come out in such bold relief as we look back on Rome, and exerted such overmastering power over the world in all the ages of her prosperity, that we are not accustomed to allow much worth to the efforts or productions of her mind. Her schools of philosophy were borrowed, as well as her science and her art, and never became entirely naturalized in the new soil to which they were transplanted. And after Rome came the deluge which destroyed her ; nor need we look for science or philosophy until its wild waves had ceased to break upon all the monuments of her culture, and had retreated, so far, at least, that civilization could find some safe spots whereon to rest, and begin again her almost forgotten work. She sowed her seeds, and they grew with rank luxuriance in the fat slime the waters of desolation had left behind them. Long did that most unjust epithet — *the Dark Ages* — cleave to the centuries which immediately preceded and followed the Crusades. But this injustice was the child of ignorance. We do not often hear this epithet now, and never from those who know what they are speaking of. There was error enough, falsity enough, folly enough ; perhaps as much of all of these as shall be discovered a thousand years hence among the relics of our own enlightened times. But there was earnest, powerful, and productive thought, to which we are indebted far more deeply

than we always acknowledge. Gladly would we pause and dwell upon this enticing topic ; and to it we may, at some future time, return ; but now let us pass at once to the inquiry, how far knowledge became popularized, that is, generally diffused among the people, and made generally accessible to them, in these mediæval ages.

There were many learned men in those days. The monastery was not always, as we good Protestants are apt to think, the home of idleness and ignorance. Through the disastrous eclipse which threatened to darken the world, the priests and monks preserved and transmitted all the learning of the day. The great and unquestionable efficacy of the press in making books numerous and cheap, is commonly illustrated by half a dozen anecdotes, culled out for this purpose ages ago, some of them of doubtful authority, but all repeated in regular series by everybody who speaks of this subject, as if they represented the exact truth and the whole truth. This they do not. Just such anecdotes might be told of enormous prices paid for books in a few instances in these days ; and they would represent the present condition of the book market just as accurately. Or, to go to the opposite extreme, our successors might as well cite the catalogue of Harpers' two-columned abominations, in proof that the regular price of a good book, at the present time, was twenty-five cents. Modern investigation — and we may thank the Germans for it — has shown how the truth was. Books were then vastly more rare than now, and, in equal proportion, were costly. But there were a great many good books. Some of these were very good and very common, and by no means very dear. In a great number of monasteries, regular copyists were constantly employed ; and in many, the number of transcribers was so great, and the work so regular and productive, that they were little else than book manufactories ; and there were many persons not monks, employed professionally in the same labor. A little consideration of the case would lead us to the same conclusion with the facts which modern inquiry has brought to light. A copyist, trained for years in this work, and devoted to it, would necessarily acquire a certain skill and facility. They had not our running hand, but their cheaper manuscripts were written in a way which permitted them to be written rapidly. A skilful writer could copy as

much as a common octavo volume in a fortnight ; and why should it then cost more than the earnings of a fortnight of any common labor, together with the price of the materials ? The common law of demand and supply would prevent this ; for the business of copying was open to every one, and was particularly suited to the members of that vast brotherhood, the monks. They could work cheap, for their foundations afforded lodging always, and generally food, and they had no wives and children to maintain. There were many books, and many readers ; but these were, nearly all, of one class, and that the religious class. And they probably had no wish to extend beyond their own limits an advantage extremely important to them. As a class, they possessed this monopoly ; and as it certainly contributed to establish their power, they as certainly preserved it with much jealousy. It is impossible to deny — we doubt whether any intelligent Catholic does now deny — that through these ages there was a disposition on the part of the clergy to keep the laity ignorant. We may then say, that the knowledge of those days was widely dispersed through a very numerous class, but was confined to that class. And this was something more than had existed in Greece and Rome, for the reason that this class was far more numerous than any reading or learning class had ever been in those nations. But between these two classes — those who had all the learning, and those who had none — there was more than a distinction ; there was an abyss.

For an illustration of this, let us look at the lives and fame of some few of the most distinguished intellects of these ages. Much the greater number of these great men wrote only for their clerical brethren, and were little known out of that wide circle. But there were also some whose names at least were popular ; were on everybody's tongue, and spoken of to everybody's children, and so came down to succeeding ages by tradition. Let us look at some of these, and see what became of their good names ; at a few only — and these taken at hazard, as they occur to us — for they tell the same story which the others could but confirm.

Let us speak of Roger Bacon of the thirteenth century, of Michael Scott, his contemporary, and of Cornelius Agrippa, and Martius Galeotti, (whom Walter Scott immortalized and caricatured in his *Quentin Durward*,) of the next century.

What is generally known of them? In their own countries, and among the populace, they are simply wizards — professors of the black art; and this by a tradition which goes back to their own day. By the better instructed, they are regarded — with some exceptions in favor of Roger Bacon — either as charlatans who practised upon the weakness and ignorance of their times, or as fools who verily believed they possessed the mysterious powers undoubtedly ascribed to them by popular opinion. Now, what in fact were they? Michael Scott, chiefly known to us for his skill in “gramarye” — figuring in Boccaccio’s tales as a sorcerer, and put by Dante in his Hell in the same capacity, — travelled widely, was a courtier, and long a resident at the court of Edward II., by whom he was greatly favored, a physician of the highest repute, master of the learning of his day, well acquainted with Latin, which all scholars then knew, and with Greek which very few knew, and the translator of Aristotle’s work on animals, from the Arabic, (having no access to the original,) and author of many works upon various subjects. Cornelius Agrippa was a successful soldier, knighted for his courage, then a Professor of Hebrew in France, a member of the government of Pisa, expelled from Mentz of which he had been syndic, chiefly because he protected a young peasant woman accused of sorcery, physician of the mother of Francis First, dismissed by her because he refused to act as her astrologer, and then sought at once by the king of England, by two German princes, and by Margaret, regent of the Low Countries, to whom he went. He died at 49, and with all the labors of a very active life, wrote many books which have been collected and published in several editions. Galeotti was also at once a distinguished cavalier and one of the most learned men of his day, the instructor and favorite of a king and a pope, a little heretical, but saved from persecution by the personal regard of his pupil Sextus IV., and giving no better reason for the picture of a luxurious and crapulous profligate which Scott draws of him, than the fact that he was excessively corpulent, and as some said, died from too much fat. The race of scholars has been generally thought in little danger of this fate. And what of Roger Bacon? He was a man so learned, so inventive, that it was impossible wholly to obscure his fame. Gunpowder he certainly knew,



for he tells how to make it ; he was acquainted with important principles of optics and some properties of lenses, perhaps with the magic lantern and the telescope — of which he speaks only less precisely than of gunpowder, — to say nothing of other intimations that must have no meaning, as the learning of this day, which believes itself universal and complete, cannot attach any meaning to them. He was besides, an author, and a voluminous one, upon a great variety of subjects, nearly all of which are of a scientific character. But he, too, like all the rest we have named, and so many other learned men in those days, was, to the public, simply and solely, a magician, a sorcerer. There can hardly be better proof of the impassable distance between the scholar and the people. It was not merely that they did not understand him, and had no sympathy with him ; but he was for them a being of a different order. His life, his interests, his employments, were with another world. There was no path from him to them ; no connecting link between him and them. No thought on his part of lifting them nearer to himself by the communication of his knowledge, and never the slightest thought on their part of rising to, or towards, his position. They no more supposed that the day could ever come when men should generally be educated men and bookmen, than we contemplate a future in which the children of our public schools shall all be made conjurors and skilful in necromancy. The “benefit of clergy,” that is, exemption from punishment by the civil authority, was given to all who could *write*, because this was held to be proof that the criminal was a priest. The conclusion is inevitable, that there was no more “diffusion of knowledge” among such a people than among those who lived thousands of years before in the darkness of Egypt. But there was this great difference ; there existed in the mediæval ages a very numerous class, most of whom were tinctured, and many deeply imbued, with all the learning of the day, such as it was, and some of whom were scholars.

And then came Protestantism, to open the doors of their prisons, or their asylums, to operate upon half of Europe directly by breaking down barriers which had been well-nigh impassable, and upon the other half of Europe by an example which could not fail to exert great influence.

Then, too, came the press, with power to give to all discovered truth immediate diffusion; a power of which we have not fathomed the depth, and of which we cannot yet anticipate the whole effect even by conjecture. But great changes are always gradual. Scholars were no longer, — *ex-officio*, as we may say, — wizards. It was no longer a matter of certainty in the opinion of ignorant people, that he who had learned much had learned it of the Devil. The example set by the leaders of Protestantism in appealing to the people, writing expressly for them and to them, began to have its effect upon literature and science. Although some ages yet passed before the use of Latin as the common language of the learned ceased, and every nation possessed in its own tongue its own literature, still there was a constant preparation for this result, and at length it came. This was a great fact. And then, the effort went on to give to the masses knowledge and cultivation, — went on even in Europe, in the face of many obstacles, of ancient prejudices whose roots had entwined themselves about all the foundations of the social fabric, of habits which had become a part of the very life of nations. Still it went on; and at length a New World was opened for this great work. That name was first given to America for a geographical reason, because it seemed to balance the old continent upon the globe. We claim it now for a better reason; we use it in a better sense. Here has begun indeed a New World, a new social and political fabric; with new thoughts, new hopes, new ends, new means, and new endeavors. Can it be doubted that the wide, the widest, diffusion of knowledge is to be one great effect of the influences which are forming us, and one great instrument in the building up of that future of which no boldness that had not become folly would dare to draw even the outlines. “The diffusion of knowledge;” the phrase was never heard until a few years ago; and now the thing is drawing near, and at this time and in this country surely we have reached “the beginning of the end.” Mankind must now wait and hope, not for the birth, but for the development of that great good, for which there has been so long a preparation, and towards which there has been so slow a progress.

We could hardly have taken any of the latest scientific works which would not testify to the truth of this assertion;

but those of which we have put the titles at the head of our article, do this in an especial manner. In the "Principles of Zoölogy," the first naturalist of the age, aided by a kindred mind which he found in this country of his adoption, has given the last results of his science. It is a book which any laborer might buy for less than the wages of one day, and is thus within the means of every purse. It is written "for the use of schools and colleges," and therefore every thing is stated in the plainest and simplest manner, and so brought within the reach of every intellect. But the reader — unconscious, it may be, of the powerful genius and vast amount of labor implied in the ability to give to him this simple work — will get from it treasures of knowledge which could not, but for this book, be acquired without long study of many expensive volumes. Is the knowledge thus imparted any poorer because it is made so cheap; is it the worse in quality or quantity because it is so skilfully adapted to the untaught intellect? Not so. The most recondite subjects are treated of; no difficulties are evaded. If any one wished to learn the latest conclusions of science upon the functions and organs of animal life, the peculiar modes of reproduction and the metamorphoses of animals, about which until very recently so little was accurately known, the new and most interesting branch of Physiology to which the name Embryology has been given, and the animal economy in general, we know not where he could go with greater certainty of finding them than to this cheap, and simple, and unpretending book. The preface begins thus: "The design of this work is to furnish an epitome of the leading principles of the science of Zoölogy, as deduced from the present state of knowledge, so illustrated as to be intelligible to the beginning student;" and this design is thoroughly accomplished.

There is another work of somewhat kindred character, which has already been reviewed by us, but we would turn to it again in this connection. We refer to Professor Guyot's "Earth and Man." This is a volume consisting of Lectures delivered in *French*, but nevertheless to a large audience in Boston, and published in English, as translated by his friend, Professor Felton. The subject of these Lectures is, Geography in the highest sense of that word, in the new sense of it; for geography in the hands of Humboldt, Ritter, and

Steffens, of whom Guyot speaks as "with a sentiment of filial piety," and of Guyot himself, who will hereafter be named with them, is indeed a new science. It has now the most profound moral import and tendency. And this cheap little volume,—suggestive in the highest degree, full of deep learning and great ability, although in the rapidity and extent of some of its generalizations open to question,—this little book has already been widely circulated and introduced as a text-book in many schools.

The second book on our list consists of papers read and discussions held at the meeting, at Cambridge, in August, 1849, of the American Association for the Advancement of Science. This Association was formed a few years ago, and at first was confined in its scope to the science of Geology and those sciences immediately connected with it. Soon, however, it took its present form; and though we do not like to limit the word "science" to the knowledge of external nature, that meaning of the word has become so common that its use in this sense, in the title, can hardly mislead any one. The science, or the philosophy, of mind, does not come within their range, excepting as it may be introduced by other topics. But every truth connected with the condition or the laws of matter, whether in the organic or the inorganic form, they welcome. The Association now numbers in its catalogue more than five hundred members. It meets every year and sometimes oftener, not in one fixed place, but by turns in our principal cities, north and south, east and west. Its presence is earnestly invited and cordially welcomed. Its meetings are public, and are always well attended, by persons of both sexes. And there the public listens to the discussion of interesting questions in all the departments of natural science, by the ablest and most celebrated men; and if the object of its founders had been to construct and set in motion machinery for the widest diffusion of these sciences, they could not have done more to effect that purpose.

The third book upon our list is in many respects a very remarkable work. In connection with the topic which we are now considering, we would speak not so much of the book itself, as of the author. And well may we hold him out as a proof of the descent of knowledge into the lowest ranks of social life, and as an instance of its elevating power.

Mr. Miller was born in Scotland ; he lost his father when he was five years old, and his mother encountered in the nurture of her children all the hinderances of poverty. He received no better education than could be given him by the humble school of his native village ; and when — to use his own words, — he was “ but a slim, loose-jointed boy,” he went to work as a laborer in a stone quarry. There, he learnt his first lessons in Geology. What is he now ? One of the first geologists of his age, and *the first* geological writer, if he deserves what Dr. Buckland said of him, as reported in the Proceedings of the British Association for the Promotion of Science.

“ Dr. Buckland said, he had never been so much astonished in his life by the powers of any man as he had been by the geological descriptions of Mr. Miller, which had been shown to him in the “ Witness ” newspaper by his friend Sir C. Menteth. That wonderful man described these objects with a facility which made him ashamed of the comparative meagreness and poverty of his own description in the “ Bridgewater Treatise,” which had cost him hours and days of labor. He (Dr. Buckland) would give his left hand to possess such powers of description as this man ; and if it pleased Providence to spare his useful life, he, if any one, would certainly render the science attractive and popular, and do equal service to Theology and Geology. It must be gratifying to Mr. Miller to hear that his discovery had been assigned his own name by such an eminent authority as M. Agassiz ; and it added another proof of the value of the meeting of the Association, that it had contributed to bring such a man into notice.”

Let us add only the testimony of Agassiz :

“ The geological works of Hugh Miller have excited the greatest interest, not only among scientific men, but also among general readers. There is in them a freshness of conception, a power of argumentation, a depth of thought, a purity of feelings, rarely met with in works of that character, which are well calculated to call forth sympathy, and to increase the popularity of a science which has already done so much to expand our views of the Plan of Creation. The scientific illustrations published by Mr. Miller are most happily combined with considerations of a higher order, rendering both equally acceptable to the thinking reader. But what is in a great degree peculiar to our author, is the successful combination of Christian doctrines with pure scientific truths. On that account his works deserve peculiar attention. His generalizations have nothing of the vagueness

which too often characterize the writings of those authors who have attempted to make the results of science subservient to the cause of religion. Struck with the beauty of Mr. Miller's works, it has for some time past been my wish to see them more extensively circulated in this country; and I have obtained leave from the author to publish an American edition of his "Footprints of the Creator," for which he has most liberally furnished the publishers with the admirable wood-cuts of the original."— p. xi.

We shall presently speak of this book again, in another connection.

We might here speak, not only of many other books, but of many institutions scattered through our land, as our countless lyceums, &c., which are doing the same work. At their head would stand the Lowell Institute; not as *primus inter pares*, but as a thing by itself; and as a thing which, *if* it might have existed elsewhere and in other ages, could never have operated with the same energy and success at any other time and place, as now and here. But we must forbear; for we would devote what space is left to us to the consideration of another, but a connected topic.

Whither does all this tend; to what result will it lead mankind; what is even now its moral influence upon human character? These questions are often asked, and sometimes with anxiety. A new power is to be created. Men are to be endowed with greatly enlarged faculties for good and for evil. And they who remember the sad tale which history has been telling for so many ages,—of evil passions which no repressing force could restrain from destructive explosion, of errors which grew and spread until they first darkened and then desolated society, of the fierce conflicts which have expended, in the violent outbreak of furious excitements or in the efforts necessary to resist and control them, so very large a part of all the human energy that has been put forth on earth,—they who have listened while history uttered to them the mournful wailing of humanity in all its ages, may well fear that when men shall again be stirred with the same passions to the same violence, they will know how to be destructive, how to be infernal, and to do the work of devils, as they never knew before; and then the generations will read a commentary written with blood and fire upon the text, "knowledge is power."

It may be so. Through some phase of this kind, Providence may permit human society to pass, and will permit, if man will not learn otherwise how to use for good, the great good given to him. But this will not be the end. Truth is not evil, and will not always do an evil work. And at this moment, when floods of knowledge are impending over the world, and men ask anxiously whether they are to be as the latter rain, bringing freshness and new life and infinite beauty to the parched fields of life, or as another deluge, — at this moment, we look with hope and with gladness to one indication that they will come for good. We find this indication in the religious character which scientific truth is now putting on ; in the kind and quality of this religion ; and in the relation which is beginning to be developed between what we will call — although in words which do not precisely express our meaning — revealed truth and scientific truth.

We could not show this, — at least, we could not prove this, — without citations from very many sources ; for the proof should be the concurrent testimony of multitudes of witnesses. And just this proof we could bring, if this were the fitting occasion. But we must confine ourselves now to such instances as will serve to show what we mean ; and we find them in the works of which we have already spoken.

Thus, on the first page of the “*Principles of Zoölogy*” it is said, —

“Man in virtue of his twofold constitution, the spiritual and the material, is qualified to comprehend Nature. Having been made in the spiritual image of God, he is competent to rise to the conception of His plan and purpose in the works of Creation. Having also a material body, like that of animals, he is also prepared to understand the mechanism of organs, and to appreciate the necessities of matter, as well as the influence which it exerts over the intellectual element, throughout the whole domain of Nature.” — pp. 1, 2.

“Such are some of the general aspects in which we are to contemplate the animal creation. Two points of view should never be lost sight of, or disconnected, namely, the animal in respect to its own organism, and the animal in its relations to creation as a whole. By adopting too exclusively either of these points of view, we are in danger of falling either into gross materialism, or into vague and profitless pantheism. He who beholds in Nature nothing besides organs and their functions, may per-

suade himself that the animal is merely a combination of chemical and mechanical actions and reactions, and thus becomes a materialist.

“On the contrary, he who considers only the manifestations of intelligence and of creative will, without taking into account the means by which they are executed, and the physical laws by virtue of which all beings preserve their characteristics, will be very likely to confound the Creator with the creature.

“It is only as it contemplates, at the same time, matter and mind, that Natural History arises to its true character and dignity, and leads to its worthiest end, by indicating to us, in creation, the execution of a plan fully matured in the beginning, and invariably pursued ; the work of a God infinitely wise, regulating Nature according to immutable laws, which He has himself imposed on her. — pp. 9, 10.

“These different faculties, taken together, constitute *intelligence*. In man, this superior principle, which is an emanation of the divine nature, manifests itself in all its splendor. God ‘breathed into him the breath of life, and man became a living soul.’ It is his prerogative, and his alone, to be enabled to guide his conduct by the deductions of reason ; he has not only the faculty of exercising his judgment upon the objects which surround him, and of apprehending the many relations which exist between himself and the external world ; he may also apply his reason to immaterial things, observe the operations of his own intellect, and, by the analysis of his faculties, may arrive at the consciousness of his own nature, and even conceive of that Infinite Spirit, ‘whom none by searching can find out.’ ” — p. 44.

“The records of the Bible, together with human tradition, teach us that man and the animals associated with him were created by the word of God ; ‘the Lord made heaven and earth, the sea and all that in them is ;’ and this truth is confirmed by the revelations of science, which unequivocally indicate the direct interventions of creative power.” — p. 182.

“The link by which they are connected is of a higher and immaterial nature ; and their connection is to be sought in the view of the Creator himself, whose aim, in forming the earth, in allowing it to undergo the successive changes which Geology has pointed out, and in creating successively all the different types of animals which have passed away, was to introduce Man upon the surface of our globe. Man is the end towards which all the animal creation has tended, from the first appearance of the first Paleozoic Fishes.

“In the beginning His plan was formed, and from it He has never swerved in any particular. The same Being, who, in view



of man's moral wants, provided and declared, thousands of years in advance, that 'the seed of the woman shall bruise the serpent's head,' laid up also for him in the bowels of the earth, those vast stores of granite, marble, coal, salt, and the various metals, the products of its several revolutions; and thus was an inexhaustible provision made for his necessities, and for the development of his genius, ages in anticipation of his appearance.

"To study, in this view, the succession of animals in time, and their distribution in space, is therefore to become acquainted with the ideas of God himself. Now, if the succession of created beings on the surface of the globe is the realization of an infinitely wise plan, it follows that there must be a necessary relation between the races of animals, and the epoch at which they appear." — pp. 206, 207.

From Mr. Guyot's book we may quote the following passages. He closes his preface thus: —

"Few subjects seem more worthy to occupy thoughtful minds, than the contemplation of the grand harmonies of nature and history. The spectacle of the good and the beautiful in nature, reflecting everywhere the idea of the Creator, calms and refreshes the soul. The view of the hand of Providence, guiding the chariot of human destinies, reassures and strengthens our faith. May these unpretending sheets, launched upon the sea of publicity, reach those who feel the need of both, and by them be kindly received. — p. viii.

"But, gentlemen, it is not enough to have seized, in this point of view, entirely physical as yet, the functions of the great masses of the continents. They have others, yet more important, which, if rightly understood, ought to be considered as the final end for which they have received their existence. To understand and appreciate them at their full value, to study them in their true point of view, we must rise to a higher position. We must elevate ourselves to the moral world to understand the physical world, which has no meaning except by it and for it." — pp. 10, 11.

"Gentlemen, I may treat this beautiful subject inadequately; but I have a deep conviction that it is worthy to occupy your leisure, as it will occupy for a long time to come, if I am not mistaken, the most exalted minds, and those most ripened for elevated researches. For him who can embrace with a glance the great harmonies of nature and of history, there is here the most admirable plan to study; there are the past and future destinies of the nations to decipher, traced in ineffaceable characters by the finger of Him who governs the world. Admirable order of the

Supreme Intelligence and Goodness, which has arranged all for the great purpose of the education of man, and the realization of the plans of Mercy for his sake ! ” — pp. 16, 17.

“ All is order, all is harmony in the universe, because the whole universe is a thought of God ; and it appears as a combination of organisms, each of which is only an integral part of one still more sublime. God alone contains them all, without making a part of any.” — p. 78.

“ It is in this great union, foretold alike by the order of nature and by the gospel, that every continent, as well as every people, will have its special functions, and that we shall find the solution and the definitive aim of all the physical and historical contrasts which we have been studying. Every thing in nature is arranged for the accomplishment by man of the admirable designs of Providence for the triumph of the good ; and if man were faithful to his destination, the whole world would appear as a sublime concert of nature and the nations, blending their voices into a lofty harmony in praise of the Creator.

“ We are touching upon the close of our course ; we are far distant indeed from the point whence we started. Nevertheless, we have arrived hither, I believe, by a natural and regular path. Before we separate, gentlemen, allow me to add a few words upon the spirit and method which have animated and directed our studies.

“ All is life for him who is alive ; all is death for him who is dead. All is spirit for him who is spirit ; all is matter for him who is nothing but matter. It is with the whole life and the whole intellect that we should study the work of Him who is life and intellect itself.

“ This work of the Supreme Intelligence — can it be otherwise than intelligent ? The work of Him who is all life and all love — must it not be living and full of love ?

“ How should we not find in our earth itself the realization of an intelligent thought, of a thought of love to man, who is the end and aim of all creation, and the bright consummate flower of this admirable organization ?

“ Yes, certainly, it is so. Faith so teaches, inspiring us with this sentiment, vague still, yet profound. Science so teaches by a patient and long-continued study, reserving this sublime view as the sweetest reward for our labor. Faith, enlightened and expounded by science, — the union of faith and science, — is living, harmonious knowledge, is perfected faith, for it has become vision.” — pp. 308, 309.

Let us now turn to the proceedings of the American Association for the Advancement of Science. We will make but

two quotations. One from a paper on Animal Morphology, by Professor Agassiz, on page 412, in which he says, —

“ By study, we have been approaching towards the knowledge of the plan displayed in the animal kingdom. We have been able to trace many relations which could not be ascertained at first sight. We have discovered relations which remained unintelligible until extensive comparisons had been made, giving us an insight into them. We have raised the question, whether there is not really in the animal kingdom, a plan illustrating the principle of its origin. To express it in one word, we have been led to consider the animal kingdom not merely as a beautiful combination of isolated phenomena, easily brought into intelligible connection by the efforts of our minds, but as a *Thought of a Supreme Intelligence manifested in material reality*. That is the view I take of the animal kingdom; a view which greatly differs from the one generally entertained regarding it.” — p. 412.

Our next and last quotation shall be from the last paper in this volume, a Mathematical Investigation of the Fractions which occur in Phyllotaxis. We would gladly dwell upon the very singular arrangement which is now found to prevail in the order of leaves upon the stems of plants, and the astonishing analogy between this order and that which governs the relative times of rotation, or rather the relative mean motions of the planets; but we must forbear. In his interesting paper on this subject, — and the volume could not have had a more beautiful or more appropriate close, — Professor Peirce says, —

“ I do not regard these fractions as isolated and independent of each other; but all of them seem to me to be approximations, more or less accurate, to one and the same fraction, or rather to several fractions of *one series*. It is as if in the forms of vegetable growth, there had been one great thought underlying the whole structure. The thought has in it an element of infinity, but the mode of expression is necessarily finite. It is everywhere partially developed, with more or less approach to perfection in different plants. This very defect of expression has enabled us to discern and comprehend the divine idea with our finite capacities. Had it been fully expressed, we should not probably have discovered it. Most certain it is that if the infinite fraction had been introduced into the creation, we could not have detected it; for the infinite series would not have been completed, even though the tree had grown to heaven itself.” — p. 445.

"I must now take the liberty to draw the attention of the Association to another domain of the physical universe, in which there are distinct traces of these same fractions. They are approximate expressions of the relative times of rotation of the successive planets of the solar system. Thus the ratio of the mean motion of each planet to that of the next inner planet is nearly equal to some one of these fractions. This is so manifest, that all the great inequalities of long period which occur in the solar system depend upon these ratios, and they are interwoven with all the most important irregularities of motion of the primary planets. Whence could this extraordinary coincidence have arisen but from the action of a single mind? and what does it indicate but that the same Word which created the planet, is expressed in the plant?"

"May I close with the remark, that the object of geometry in all its measuring and computing, is to ascertain with exactness the plan of the great Geometer, to penetrate the veil of material forms, and disclose the thoughts which lie beneath them? When our researches are successful, and when a generous and heaven-eyed inspiration has elevated us above humanity, and raised us triumphantly into the very presence, as it were, of the divine intellect, how instantly and entirely are human pride and vanity repressed, and by a single glance at the glories of the infinite mind, we are humbled to the very dust." — pp. 446, 447.

From Miller's "Footprints of the Creator" it is difficult to quote isolated passages which, more than others, show its profoundly religious character. The whole work is professedly, in design and in execution, a religious work. Most persons know something — not many now know much — about a book which was very widely read a few years ago, called "Vestiges of Creation." This book endeavored to give scientific proof, and with a most imposing parade of universal knowledge, in favor of what is called the theory of development; — which is, that the first organized being was an animated atom which gradually became an animal of the lowest form, and then slowly expanded into a mollusc, which afterwards grew into a fish, and this came, after many attempts, on dry land, and converted its fins into legs and became a reptile, and the reptile shot out wings and became a bird, and the bird dropped its wings downward and made legs of them and became a beast, and the beast after awhile rose erect and became a man. This is not necessarily atheistical, because it is not inconsistent with the belief that God made chaos,

and imparted to its atoms the qualities which enabled them to begin and carry forward this serial development. But it is eminently, not to say absolutely, irreligious. First, because it ignores, if it does not deny, the present and continuing action and providence of God; and next, because it expressly limits all expectation of a better condition of the race hereafter to mere progress in development, and gives to the individual no hope of living after death, unless the atoms which compose him chance to take upon themselves an animated form; — that is to say, no hope whatever of living hereafter as the same person, with a consciousness of his identity. It is against this book and this system, that Miller writes; and never, when he wrought with the sledge-hammer in his hand, did he do a work of more perfect demolition. He exposes the pretensions, the ignorance, and the unfairness of the anonymous author of the “*Vestiges*,” and shows his reasoning to be as feeble and unconvincing as his data are false or insufficient. He admits the evidence of progress; of progressive creation; but he asserts, or rather supposes, for he knows too much not to know the limits of his knowledge, that this simultaneous progress of the earth as the habitation of life, and of the forms of life dwelling upon it, exhibits very clearly a putting forth of creative power, from time to time, in exquisite adaptation to the gradually advancing fitness of this home for higher and then higher forms of life, until, as soon as it became fit for man, and not before, man was created. In the last paragraph of the book, he says, —

“But it may be judged that I am trespassing on a field into which I have no right to enter. Save, however, for its close proximity with that in which the geologist expatiates as properly his own, this little volume would never have been written. It is the fact that man must believingly coöperate with God in the work of preparation for the final dynasty, or exist throughout its never-ending cycles as a lost and degraded creature, that alone renders the development hypothesis formidable. But inculcating that the elevatory process is one of the natural law, not of moral endeavor — by teaching inferentially at least, that in the better state of things which is coming there is to be an identity of race with that of the existing dynasty, but no identity of individual consciousness, — that, on the contrary, the life after death which we are to inherit is to be merely a horrid life of wriggling impurities, originated in the putrefactive mucus, — and

that thus the men who now live possess no real stake in the kingdom of the future, — it is its direct tendency, so far as its influence extends, to render the required coöperation with God an impossibility. For that coöperation cannot exist without belief as its basis.” — pp. 336, 337.

In his Preface, he says, —

“It will, I trust, be found, that in dealing with errors which, in at least their primary bearing, affect questions of science, I have not offended against the courtesies of scientific controversy. True, they are errors which also involve moral consequences. There is a species of superstition which inclines men to take on trust whatever assumes the name of science; and which seems to be a reaction on the old superstition, that had faith in witches, but none in Sir Isaac Newton, and believed in ghosts, but failed to credit the Gregorian calendar. And, owing mainly to the wide diffusion of this credulous spirit of the modern type, as little disposed to examine what it receives as its ancient unreasoning predecessor, the development doctrines are doing much harm on both sides of the Atlantic, especially among intelligent mechanics, and a class of young men engaged in the subordinate departments of trade and the law. And the harm, thus considerable in amount, must be necessarily more than merely considerable in degree. For it invariably happens, that when persons in these walks become materialists, they become also turbulent subjects and bad men. That belief in the existence after death, which forms the distinguishing *instinct* of humanity, is too essential a part of man’s moral constitution not to be missed when away; and so, when once fairly eradicated, the life and conduct rarely fail to betray its absence. But I have not, from any consideration of the mischief thus effected, written as if arguments, like cannon-balls, could be rendered more formidable than in the cool state by being made red hot. I have not even felt, in discussing the question, as if I had a man before me as an opponent; for though my work contains numerous references to the author of the “*Vestiges*,” I have invariably thought on these occasions, not of the anonymous writer of the volume, of whom I know nothing, but simply of an ingenious, well-written book, unfortunate in its facts, and not always very happy in its reasonings.” — pp. vi. — viii.

There is still one other passage which we cannot forbear quoting. It is equally excellent in its rebuke of those who cannot accept a fact if an enemy has used it, in its hints towards a higher metaphysics, and in its dealings with what would be one of the most dangerous, if it were not the most

nauseating of the tricks of modern infidelity. If hypocrisy be the tribute that evil pays to good, we might infer that truth has made some progress in subduing falsehood, from the abundance and prompt payment of this tribute. And we need some such thought as this, to mitigate the pain and disgust with which we hear the malignant infidelities around us use to express their sophisms and falsehoods, words which should have a far better meaning.

“There is no geological fact nor revealed doctrine with which this special scheme of development does not agree. To every truth, too, really such, from which the antagonist scheme derives its shadowy analogies, it leaves its full value. It has no quarrel with the facts of even the “*Vestiges*,” in their character as realities. There is certainly something very extraordinary in that fœtal progress of the human brain on which the assertors of the development hypothesis have founded so much. Nature, in constructing this curious organ, first lays down a grooved cord, as the carpenter lays down the keel of his vessel; and on this narrow base the perfect brain, as month after month passes by, is gradually built up, like the vessel from the keel. First it grows up into a brain closely resembling that of a fish; a few additions more convert it into a brain undistinguishable from that of a reptile; a few additions more impart to it the perfect appearance of the brain of a bird; it then develops into a brain exceedingly like that of a mammiferous quadruped; and, finally, expanding atop, and spreading out its deeply corrugated lobes, till they project widely over the base, it assumes its unique character as a human brain. Radically such from the first, it passes towards its full development, through all the inferior forms, from that of the fish upwards, — thus comprising, during its fœtal progress, an epitome of geological history, as if each man were in himself, not the *microcosm* of the old fanciful philosopher, but something greatly more wonderful, — a compendium of all animated nature, and of kin to every creature that lives. Hence the remark, that man is the sum total of all animals, — “the animal equivalent,” says Oken, “to the whole animal kingdom.” We are perhaps too much in the habit of setting aside real facts, when they have been first seized upon by the infidel, and appropriated to the purposes of unbelief, as if they had suffered contamination in his hands. We forget, like the brother “weak in the faith,” instanced by the Apostle, that they are in themselves “creatures of God;” and too readily reject the lesson which they teach, simply because they have been offered in sacrifice to an idol. And this strange fact of the progress of the human brain is assur-

edly a fact none the less worth looking at from the circumstance that infidelity has looked at it first. On no principle recognizable in right reason can it be urged in support of the development hypothesis ; — it is a fact of fœtal development, and of that only. But it would be well should it lead our metaphysicians to inquire whether they have not been rendering their science too insulated and exclusive ; and whether the mind that works by a brain thus “ fearfully and wonderfully made,” ought not to be viewed rather in connection with all animated nature, especially as we find nature exemplified in the various vertebral forms, than as a thing fundamentally abstract and distinct. The brain built up of all the types of *brain*, may be the organ of a mind compounded, if I may so express myself, of all the varieties of *mind*. It would be perhaps over fanciful to urge that it is the creature who has made himself free of all the elements, whose brain has been thus in succession that of all their proper denizens, and that there is no animal instinct, the function of which cannot be illustrated by some art mastered by man ; but there can be nothing over fanciful in the suggestion, founded on this fact of fœtal development, that possibly some of the more obscure signs impressed upon the human character may be best read through the spectacles of physical science. The successive phases of the fœtal brain give at least fair warning that in tracing to its first principles the moral and intellectual nature of man, what is properly his ‘ natural history ’ should not be overlooked. Oken, after describing the human creature in one passage as ‘ equivalent to the whole animal kingdom,’ designates him in another as ‘ God wholly manifested,’ and as ‘ God become man ;’ — a style of expression at which the English reader may start, as that of the ‘ big mouth speaking blasphemy,’ but which has become exceedingly common among the rationalists of the Continent. The irreverent naturalist ought surely to have remembered, that the sum total of all the animals cannot be different in its nature from the various sums of which it is an aggregate, — seeing that *no* summation ever differs in *quality* from the items summed up, which compose it, — and that, though it may amount in this case to man *the animal*, — to man as he may be weighed, and measured, and subjected to the dissecting knife, — it cannot possibly amount to God. Is God merely a sum total of birds and beasts, reptiles and fishes ; — a mere Egyptian deity, composed of fantastic hieroglyphics derived from the forms of the brute creation ? The impieties of the transcendentalist may, however, serve to illustrate that mode of seizing on terms which, as the most sacred in the message of revelation, have been long coupled in the popular mind with saving truths, and forcibly compelling them to bear some visionary and illusive meaning, wholly foreign to that with which they were



originally invested, which has become so remarkable a part of the policy of modern infidelity. Rationalism has learned to sacrifice to Deity with a certain measure of conformity to the required pattern ; but it is a conformity in appearance only, not in reality : the sacrifice always resembles that of Prometheus of old, who presented to Jupiter what, though it seemed to be an ox without blemish, was merely an ox-skin stuffed full of bones and garbage.” — pp. 313, 316.

But we cannot thus attempt to prove a fact so interesting as the present religious character of science, without remembering the old story — far older than Joe Miller — of the man who offered some bricks as the sample of a house. We are doing just this ; more we cannot do, for the house is not yet built. But the materials are gathering ; and from them even now, we may form some idea of the structure as it will be seen, by other eyes than ours, in its completed perfection ; — for these materials are beautiful and instinct with life. Thus, it is said by Professor Agassiz, in a passage we have already quoted, that the study of Natural History, in the view in which he labors to present it, “is therefore to become acquainted with the ideas of God himself.” And again, he declares the animal kingdom to be “a thought of a Supreme Intelligence manifested in material reality.” And Professor Peirce says, “in the forms of vegetable growth there has been one great thought underlying the whole structure.” And Professor Guyot says, “the whole universe is a thought of God.”

This truth, however prominent in the writings of Plato, did not originate with him. For he received it from the school of Pythagoras, and to that it came, perhaps, by a long tradition from that morning when the Sun of Truth first arose upon the human intellect. For a long time afterwards it was a common thought, but gradually faded away until it was nearly lost. In modern times, we find it perhaps more clearly intimated in the writings of our own Jonathan Edwards, — the great thinker of his age and country — than in any other book of note. But it has here again been expressly asserted, and the investigators into the secrets of nature who hold this torch in their hand, will find its light reflected from many a gem. “The ideas of God ;” if we know that they have given form to creation ; that they have made all his works and all his

laws to be their exponents, then has the time come when men will know that the word of God *cannot* contradict the lessons of His works; for this is then as certain as that He is truthful, and that there can be no contradiction and no inconsistency, and nothing else than infinite harmony between the Divine ideas, whatever be the mode in which He expresses them. Nor is this all. For what inducements does this truth hold out to us to study the forms, activities, and relations of created things, when it tells us that they are but the pages on which the finger of God has written revelations of Himself. What, indeed, may we not expect, what may we not demand from science.

Nor is this truth merely a metaphor. It may be one of the functions of poetry to anticipate the discoveries or the conclusions which observation and logic have not yet brought within their grasp; to see the auroral flush of a light that has not distinctly risen upon the domains of science. Her place is on the mountain top, and gladly she reports the coming day to the travellers on the plains below; and with gladness do they listen to the tidings, unless they believe darkness to be man's natural condition, — unless night be their day. So this truth has been often claimed and used by the poet; as in the exquisite lines of Goethe, where the spirit of the earth, summoned by Faust, says to him:

So schaff' ich am sausendem webstuhl der Zeit,  
Und wirke der Gottheit lebendiges kleid.\*

But poetry is dealt with most unjustly when it is placed in opposition to science. Their functions are diverse, but not antagonistic. It may be one of the things men will learn presently, that neither the one nor the other has any value except as it is the minister of truth; and that truth is not the less one, because its office is universal and its manifestation infinite in variety. Hereafter, as the dominion of science enlarges, and approaches the limits which have bounded the exclusive realm of poetry, as poetry is drawn nearer to the actualities of science by seeing that they offer to her a home and food and raiment, both will cease to look at each other with a jealous and a hostile eye; both will find that they can

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\* Very inadequately translated by Carlyle thus: —

" 'Tis thus at the roaring loom of time I ply,  
And weave for God the garment thou seest him by."

give each other strength and support, and that both are strongest when they unite in lifting the mind and heart of man towards the Source of light and warmth.

We have spoken of the quality of this religion. We hope we do not invade personal privacies, when we say that the gentlemen whom we have quoted above differ in religious belief by the whole difference which divides sects from each other. They come from different regions of the Christian doctrine; but they come together, and stand together on this ground, and there is a perfect harmony in their testimony. This we should expect; because they meet on a ground which lies within that which is occupied by mere dogmata. Let it not be supposed that we would express, or that we feel, dislike or contempt for the formal doctrines of religion. They are most useful; they are more than necessary, for they are inevitable. That belief which rests in generalities, which forms or adopts no systematic or definite exposition, is, usually at least, a belief which seeks for no form because it desires no action. It is of the imagination, or at most, a matter of opinion. Human nature, in so far as it becomes religious, demands and acquires something more. It feels that it is not rich by possessing ground upon which nothing grows. Doubtless it has erred in almost every possible way in its efforts to supply this want. But numerous and various as have been and are the forms in which religious faith has clothed itself; true, as it certainly is, that in all of these there is much that is the work of man and the evidence of human weakness; it is also certain that in all of them there is more or less of truth, and of truth that leads to good. Not only do different nations in different ages adopt different creeds, but, where there is any freedom of thought, different individuals, at the same time and place, manifest the diversities of genius and temper, perhaps of spiritual needs, by going in pursuit of that object in different directions. They who content themselves with sublime axioms and universal principles, may feel a contempt for others who must have more definite, positive, and doctrinal truths. But they greatly err; they may have all that they want; but they should not mistake the absence of appetite for the abundance of food. The believing heart compels the believing mind to choose, to form, to hold, a faith which shall give an answer to its questioning, and

define its hopes, and offer guidance and support to its life. Various as are the past and present forms of religious faith, their value and their truthfulness may be tested and measured by the degree in which they incorporate the infinite certainties of religion, and neither contradict, nor limit, nor disfigure, nor obscure them. By these certainties, we mean the personal existence of God, His love, His wisdom, His providence, and His perpetual oversight and government, and the existence within man's material nature of a higher nature, over which death has no power. The worth of all the forms of religious belief lies in their power to bring these truths down from Heaven to man's home and life upon this earth. So the infirmity of all lies in their inability to present these great truths to the mind, or, still worse, in the darkness and falsity in which they enwrap them. But where do these great and central truths come from; by what means do we hold them? They are from God Himself, given by revelation from Him; so in the beginning, and so only. This revelation must take the form of words, for it is divine truth clothing itself in human words. It takes upon itself the humble dress of human language; but it does not put off its divinity, and while it stands among men on earth, it has not left the Heavens. Can men interpret the revelation? Yes, because this gift of infinite truth is not companionless; but with it, as the all-sufficient instruments to unveil the revelation and make its words translucent, God has given man two worlds; the world within him and the world without him. His reason, his conscience, his aspirations, his hopes, and, not less, his fears, may join in this as their highest employment; while, in this visible creation, he may see, as in a mirror, the image of his Maker. Has science begun to see in the works of God, Himself? Surely, if it has, then has it entered upon its greatest and its consummating work. With a new voice it gives forth the utterance of a new spirit. It offers itself to man's inmost needs. It has already made the steam-engine wield at his will the strength of a thousand giants; it points out to the mariner a sure way across the pathless ocean; it has made the lightning his swift messenger; — and all this is well. But if it interprets nature, and reads the lessons written on her pages, it has begun a work which can never end and must ever grow, and it will offer to him a good as much greater than all else it

has done or can do, as the Heavens are higher than the earth.

These fundamental certainties, we have said, give value to, and determine the value of, all religious doctrine ; and it is precisely these that science must discover upon the monuments of creative power, and transcribe and translate for their use for whom creation was made. Nor must science decipher these inscriptions only in a general way ; for in their most general form they have been always seen in outward nature by reflecting and religious men, but only obscurely. As science advances in the path upon which it has entered, it will first see them more distinctly, and then it will see in all its own discoveries new proofs, and in all its details new illustrations, new consequences and inferences, not merely harmonizing with these general principles, but growing from them as the blossom and the fruit grow from the living plant. And thus may science offer to religion demonstration and certainty, and not these only, but an orderly evolution ; the healthy growth of "a tree planted by rivers of waters, that bringeth forth its fruit in its season."

Religion has always been the one means by which God has sought to bring man into conformity with Himself, and into a receptivity of true and permanent happiness. There can be no other instrument than this ; for whatsoever has this effect, not by mere force of circumstances, but by its own nature, may be called religion. Given to man in forms and measure as infinitely diversified as his need, given to him that it might lead him and not that it should force him, it has exhibited in all ages a boundless diversity of aspect ; and the beauty of that aspect has always been marred by the effacing fingers of man, and sometimes wellnigh destroyed. But always and everywhere, religion, when most despised and rejected, when feeblest, and suffocated by human inventions, when desecrated and made the unwilling minister of unholy purposes and passions, — always has she continued to do, as well as it might then be done, the work which she alone could do. She has ever borne the office indicated by her name. She has ever labored — though against fearful obstacles and sometimes with very little effect — to *re-bind* the separated child to his parent. And now, if science is to provide for her new illustrations, new foundations, new defences, new in-

struments, and boundless scope, we may hardly limit the hope that invests the future of humanity with light from heaven. This hope would be fantastic and irrational, if it went so far as to see any promise of a near fulfilment. That cannot be. But such a hope may well be patient. How many ages may elapse before this consummation can arrive, is not the question, nor how much or little we have already gained, nor how fast or how slow our progress. It is enough if we can see that we have entered upon a path which leads to this result. Enough, if we see so much of this path as to guide and guard us on our way, so much of its termination as to invite our progress; and assuredly the faith that sees so much as this, does not place itself in antagonism with reason.

Then we may hope that mankind will come into full possession of a religion which shall be written in the word of God and in His works — written ineffaceably — written upon the running water, the perishing leaf, the animated atom that escapes the eye, the intangible forces that weave the warp and woof of nature, as well as upon the “everlasting hills” and the solid earth, and suns and stars. Written for a longer duration than that of the mountains whose rocks become again tables of stone on which the finger of God writes his law; for when they sink, and a new home for life and new forms of life appear, there will this religion be, unchanging and unchangeable.

Some of the passages we have quoted would indicate, what certainly is true, that a belief in the unity of creation is gaining ground. This, indeed, is a necessary effect of regarding the various forms of being as all the result of one creative power. If nature represents God, then in its indefinite variety we may read the proof that his Oneness contains within itself, and consists of, an infinitude of divine elements. This Oneness, it is perhaps impossible that a created intellect should ever fully comprehend; and of the Oneness which, from Him, combines His works into a symmetrical whole, it is certain that religion and science together cannot yet give us a clear perception. But this truth is one of which a slight knowledge may not be without its influence. Already it will help us to believe the essential peace of the universe, that must lie within its apparent war; it will help us to recognize that brotherhood of being, which leaves nothing iso-

lated, but in some way connects each atom with the whole. Whatever God has made, if he be wise, is made for some end ; and if He be one, these various ends, though many, cannot be conflicting, and there must be one great end towards which they are all directed ; one centre of the circle of being, in which all the various radii, however remote and opposite their points of departure, and however diverse their directions, may meet. And therefore this truth already permits the inference, that all the entities of the universe, whether they be great or small, whether they be bodies or forces, forms or laws, of spirit or of matter, must all and equally be coöperative ministers of Omnipotence.

If this be true of the outward world, it must be more true of the inward world, of the various capacities and qualities of human nature, of the elements of the soul. And so it must be true of individuals, each man who is not monstrous possessing all the elements of humanity, but owing his individuality to that faculty or tendency which, prevailing within him, determines his character, his function, and his destiny. How far this normal law may be suspended or violated by moral evil or falsity, we do not presume to say ; but that it is the normal law of humanity we cannot doubt. And there comes from this an inference as to the essential harmony and interdependence of all human capacities and employments, which has not been clearly seen, nor permitted to be very operative. And by interdependence we mean the necessity which each has for the aid of all the rest to enable it to do all its work. Mournful and most mischievous has been the contrary belief. The various functions of our common humanity have been severed by lines of demarcation, if not still more widely by hostility. Religion, the common centre of all, has been isolated from all ; has too often repelled all, as if their gifts were dangerous, and she was safe only in their enmity. At one time, perhaps in all times by some, whatever was beautiful and ministered to pleasure, delighting the senses and filling life with gladness, was suspected and rejected ; in utter ignorance that it is the office of religion to fill man's outward life with all the joy of refinement, and elevate pleasure into happiness, and make of the very senses golden gates to her temple. But still worse than this has been, and still is, the jealousy and opposition between reli-

gion and intellectual culture. To prove or illustrate this at length, we have not space; but one manifestation of this error may be recalled, if indeed it have wholly passed away. We mean the use of the word "freethinker" as synonymous with "unbeliever." This was not an accident. This use of the word took its place in our literature, and stands even now in our dictionaries. In one, that most used in our country, which we open at this moment, we find "freethinking," — "unbelief." These two words stand so together, and the last is the only definition given of the first. Who can measure the length, the breadth, or the depth of this vast falsehood! It is as if the only definition of light were, — darkness. The unbeliever is bound with a chain which he does not know, for the very reason that it lays so heavy a link upon every portion of his mental organization which it embraces, that he cannot try to move; and therefore unbelief cannot be universal in any mind, or the whole mind must die. Faith, the principle of faith, is the first giver of freedom. It energizes the whole intellect, the whole nature; and a rational religious belief, because it is the highest of all, gives the highest freedom. The unfettered reason, if indeed all its chains are broken, turns towards religious truth of some kind, as surely and as promptly as the healthy and uncoerced eye turns towards the light.

Mournful, in itself and in its consequences to religion, has been, — and gladly we speak of it as of the past, — the hostility between religion and science. It is pleasant to look upon the decline and fall of this empire of error. Galileo was — in despite of the modern researches which have shown his waywardness and imprudence, and softened the picture of his punishment — he *was* imprisoned by the great church power of his day for the heresy of scientific truth. Years passed on; and when Geology announced its earliest conclusions in England some thirty years ago, no inquisition could lay a torturing hand upon its professors; but who does not remember the storm of indignant wrath which fell upon them from dignitaries of the English Church. Last year, when Agassiz announced the discovery of his science, that the races of men could not have been derived from one earthly parentage, a feeble outcry from very feeble voices rose, or strove to rise upon the air; but there came back no echo from public opinion, and it has already died away.



There is now no hostility between religion and science. But the cessation of hostility is not enough. There must be in its stead amity and brotherhood, with all their love, and mutual aid, and unreserved confidence, and joy in the progress and well-being of each other. And we venture to hope that even this has begun. We venture to hope that it will go on, and bring peace within the circle of human endeavors, and the fruitfulness of peace.

In the olden time, they used to speak of the music of the spheres; and there were some who said they heard it. It may be that they did; but not with the ear of sense, for that divine harmony cannot descend so low. It may be that it will again be heard. The stars of morning, that sang together in the morning of creation, may resume their interrupted song. And in the distant ages when that song shall be heard by the listening heart, men may recognize in it the acknowledgment of God in all his works.

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ART. IV.—*Poems and Prose Writings.* BY RICHARD HENRY DANA. In two Volumes. New York: Baker & Scribner. 1850.

To many of our readers these volumes will have the freshness of novelty. The poems and fictions formerly published by Mr. Dana have been so long out of print, and most of the essays buried for so many years in the forgotten numbers of old Reviews, that some, even of those who would not willingly be thought ignorant of our native literature, will be taken by surprise. Others will recognize here, in an accessible and agreeable form, writings with which they have long been familiar; which more than once, with grateful labor, they have brought together from dark closets and dusty shelves, to which the monthlies and quarterlies which contained them were long since consigned. It is because we remember the deep interest with which we early read most of these works, and are glad to acknowledge our obligation to them, as well as from the conviction that they will form a valuable portion of our permanent literature, that we hail